



# SiliaPrep<sup>TM</sup>

SPE Cartridges and  
Well Plates





## About SiliCycle

Founded in 1995, SiliCycle® Inc. is a worldwide leader in the development, the manufacturing and the commercialization of silica gel products for chromatography, analytical and organic chemistry. With our multi-ton manufacturing capability, we are your partner of choice for all your metal removal, catalysis, synthesis, and purification requirements.

Our business extends to more than fifty countries worldwide and our customer portfolio includes companies in the pharmaceutical, biotechnology industries, contract research and manufacturing organizations as well as university laboratories and hospital research centers.

The mission of SiliCycle is to develop and market innovative silica products of high value to customers and make a technical contribution to their work.

At SiliCycle, we are at the forefront of the chromatography industry, owing to the extraordinary purity of our silica gels and our capacity to rapidly adapt these gels to meet the specific requirements of pharmaceutical professionals and university scientists.

We lead the way in offering innovative products, such as SiliaCat® heterogeneous catalysts, SiliaMetS® Metal Scavengers, SiliaBond® functionalized silica gels, SiliaFlash® Irregular silica gels, IMPAQ® angular silica gels, SiliaSphere™ spherical silica gels, SiliaSep™ flash cartridges, SiliaPrep™ SPEs and Well Plates, SiliaPlate™ TLC plates, and SiliaChrom® HPLC columns.

We offer a wide variety of first-rate Ultra Pure Silica Gels. Our automated manufacturing process, which includes acid washing and multiple analyses, is continuously optimized to ensure high purity and a low percentage of fine particles, thereby guaranteeing optimal performance.

*We are committed to provide the highest quality products and services in the industry.*



## Importance of Quality Control

The Quality Control Department's objective is to provide defect-free products. In light of this goal, we have determined the critical points that need to be addressed for each product line. These points are based on customer's and Account Managers' recommendations as well as on our employees' scientific knowledge.

Each product family has its own quality control procedures, which are strictly adhered to. QC test results are checked and confirmed by the person in charge of them before being cleared for shipping. Complete procedures for each product line are available upon request.

Thus, SiliCycle is committed to high quality standards. In doing so, every product meets the quality specifications our customers demand. All products are shipped with a Certificate of Analysis (CofA) and a sample from every batch is kept for subsequent analysis. If you feel that the product you have received does not meet these specifications, please contact us and we will make sure you are satisfied.

### Bare Silica Gel

The backbone of most of SiliCycle's products is SiliFlash F60 (40-63  $\mu\text{m}$ , 60  $\text{\AA}$ ) silica gel. It provides superior performance for chromatographic applications due to its narrow particle size distribution and high purity.

Before functionalization, every silica is rigorously characterized and analyzed by the procedures below to ensure lot-to-lot reproducibility.

### Functionalized Silica Gel

The process for functionalizing the silica is highly dependent on the group being attached. However, it is still possible to functionalize 90% of the surface, verified by  $^{29}\text{Si}$  MAS NMR. The remaining 10% of the surface may be endcapped to provide a completely inert support. After being functionalized, the product is submitted to further analysis and quality control as outlined below.

Quality Control	
Type of Analysis	Performed by:
<b>Bare Silica Gel</b>	
Carbon, nitrogen & sulfur content	Elemental analyzer
Total trace metal	ICP-OES
Surface area & porosity	Nitrogen adsorption analyzer
Particle size distribution	Laser light diffraction
Tapped density analysis	Density measurement
Water content	Moisture balance
pH	pH-meter
<b>Functionalized Silica Gel</b>	
Residual solvent content	Moisture balance
Specific reactivity analysis	GC-FID, GC-MS, LC-MS/MS, ICP-OES
Organic function signature	Infrared spectroscopy
Purity analysis	GC-MS



## Analysis Descriptions

### Elemental Analysis of Organic Compounds

SiliFlash silica gel has a very low organic content. All lots are subjected to elemental analysis to determine the carbon, nitrogen and sulfur levels.

### Total Trace Metal Analysis

To improve the quality of the separation, SiliCycle manufactures silica gels with very low traces of metal content. All silica gels are analyzed for more than 45 metals by ICP-OES down to ppm, and reach up to 99.4% silica purity. This removes any issues from metal oxides that may act as Lewis acids and prevents «Tailing» of most polar compounds (*frequently ionizable*) that can be caused by silica with a high metal content.

### Surface Area and Porosity Analysis

The efficiency and reliability of silica gel depend on its surface condition. We use the Brunauer, Emmet, and Teller analysis to determine the surface area, and the Barret-Joyner-Hatenda method to determine the pore diameter and pore volume. A larger surface area results in more contact or interaction with the analyte, thereby increasing the segregation of different products. Pore diameter and pore volume permit semi-exclusion chromatography where smaller molecules fit into pores more easily than larger ones. This justifies the use of several types of silica to achieve better discrimination in chromatographic separations.

### Particle Size Distribution Analysis

Particle size distribution is determined by laser diffraction. Usually, more than 90% of the silica gel is kept within the appropriate range.

### Water Content Analysis (*silica gel activity*)

The amount of water on the silica's surface affects chromatographic performance. An anhydrous silica gel will be extremely polar, while a wetted one will be considerably less polar. Every batch is carefully adjusted to a specific percentage of water content.

### pH Analysis

The pH can increase the retention of some ionizable compounds. However, some products can become hydrolyzed or rearranged when in contact with acidic silica. A neutral pH, with a range between 6.5 and 7.5, is the most important factor in determining the reliability and inert behavior of the silica. This pH test involves suspending the silica gel in pure water (5% w/w).



# SiliaPrep™ SPE Cartridges and Well Plates

Using SiliaPrep SPE Cartridges and Well Plates guarantees the following benefits:

- Choice of a wide variety of SiliaBond high-quality sorbents
- Very good separation (*tight particle size distribution and no fines*)
- High recoveries and yields
- Less time and solvent required for conditioning the sorbent
- Reproducible flow rates from lot-to-lot
- Excellent packing and storage qualities



## SiliaPrep Solid-Phase Extraction SPE Cartridges and Well Plates

Solid-phase extraction (SPE) is designed for rapid sample preparation and purification prior to chromatographic analysis. You can optimize your SPE protocols by using SiliCycle SiliaPrep SPE Cartridges and Well Plates.

SiliCycle offers products to meet your specific purification needs. SiliaPrep products are available in different formats including SPE cartridges and 48-, 96-, and 384-well plates, with different sorbents (*SiliaFlash and SiliaBond*), and in bed weights up to 20 grams (*>20 g are also available in SiliaSep OT formats, see page*

167). The well plates are used in high throughput combinatorial chemistry, drug discovery and screening, metabolic pharmacokinetic applications, and for automated methods such as a multiprobe approach.

By using SiliaPrep products you will generate higher purity samples and reduce the number of false positives in your screening, giving you higher quality data. SiliaPrep cartridges are packed with fines-free SiliaFlash silica gel sorbents.

### Sorbent Specifications

SiliaPrep products are packed with SiliCycle's SiliaFlash to provide superior performance for all types of applications. This is due to the narrow particle size distribution and high purity. Although the standard products included in this brochure are made of SiliaFlash F60 (40-63  $\mu\text{m}$ , 60  $\text{\AA}$ ), custom products are available with any type of silica offered in our catalog or website (*IMPAQ, irregular and spherical in various pore and particle sizes, etc.*) and in any format on a custom order basis. Contact us for more information.

### Plastic Device Specifications

Standard SiliaPrep cartridges are made with flanged polypropylene (PP) tubes and 20  $\mu\text{m}$  polyethylene (PE) frits. Other plastic materials (*Teflon®, HDPE, etc.*), frit porosity (10  $\mu\text{m}$ ), and cartridge rim's (*flangeless*) are available on a custom order basis.

## SiliaPrep Accessories

### SiliaPrep Adapters:

Enable cartridge stacking or easy SPE cartridge connection with syringe or gas lines (*for positive pressure*).

- AUT-0010 SiliaPrep Adapter 1, 3 and 6 mL SPE (12/box)
- AUT-0011 SiliaPrep Adapter 12, 20 and 60 mL SPE (6/box)



### SiliaPrep Vacuum Adapters:

Fast, user friendly, and economical adapters for SPE cartridges. Only a vacuum source is needed.

- AUT-0043 20/40 SiliaPrep Vacuum Adapter
- AUT-0044 19/22 SiliaPrep Vacuum Adapter
- AUT-0045 14/20 SiliaPrep Vacuum Adapter
- AUT-0046 22/400 Vial-SiliaPrep Vacuum Adapter without Vial Connector
- AUT-0047 22/400 Vial-SiliaPrep Vacuum Adapter with Vial Connector



### SiliaPrep Vacuum Manifold:

Run 12 or 24 samples simultaneously with a controlled flow rate for higher reproducibility.

- AUT-0128-12 SiliaPrep Vacuum Manifold 12 positions
- AUT-0129-24 SiliaPrep Vacuum Manifold 24 positions



### SiliaPrep Empty tubes:

Empty Tubes	
Formats	Description
SIM-0007-001	Empty 1 mL SPE tube with 2 frits (100/box)
SIM-0008-003	Empty 3 mL SPE tube with 2 frits (100/box)
SIM-0002-006	Empty 6 mL SPE tube with 2 frits (100/box)
SIM-0003-012	Empty 12 mL SPE tube with 2 frits (100/box)
SIM-0004-020	Empty 25 mL SPE tube with 2 frits (100/box)
SIM-0006-060	Empty 60 mL SPE tube with 2 frits (100/box)
SIM-0009-150	Empty 150 mL SPE tube with 2 frits (20/box)



## Standard Method Development Procedure

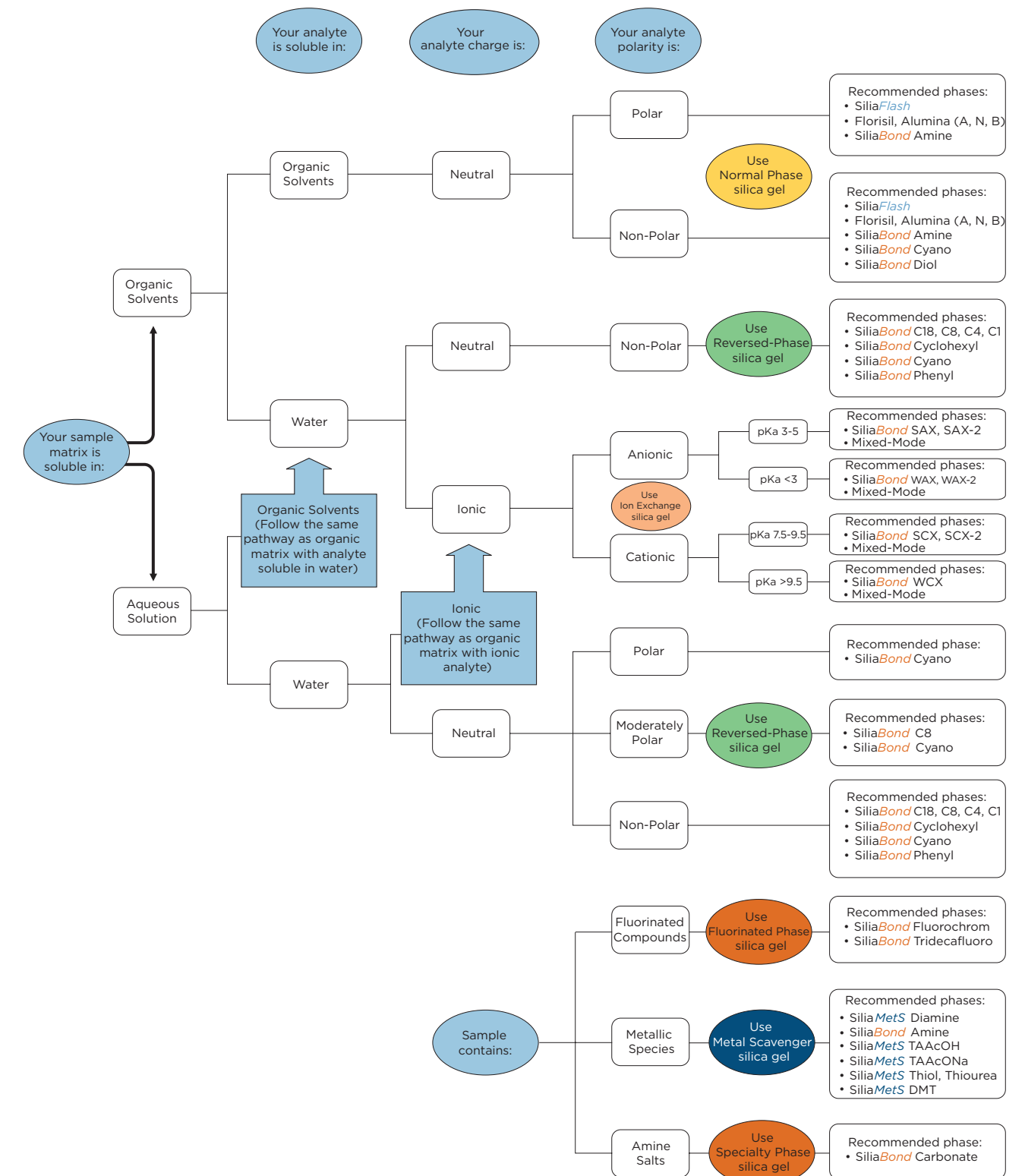
The solid phase methodology will vary depending on the sorbent (*normal, reversed, ion exchange*). Here, we propose generic methods for each phase based on sample and sorbent properties. However, procedures can be slightly different from one sample to another.

Standard Method Development Procedure			
Procedure Step	Reversed-Phase	Ion Exchange Phase	Normal-Phase
Analyte properties	Non-polar, uncharged or neutralized, hydrophobic	Ionized or charged	Slightly to moderately polar, uncharged
Matrix sample properties	Solvents and aqueous ( <i>buffer</i> )	Aqueous ( <i>buffer</i> ) and pH-adjusted solutions	Organic solvents
Conditioning step	Water-miscible organic solvents	Water-miscible organic solvents or aqueous buffered solution	Sample solvent or methanol
Sample loading	Dissolve analyte in highly polar solvents	Dissolve analyte in highly polar solvents	Dissolve analyte in low polar solvents
Washing	Aqueous or buffered solution and polar solvents	Aqueous solutions containing salts	Non-polar solvents
Elution	Polar or non-polar organic solvents	Polar solvents, may contain acids or bases	Mixture of non-polar (5 - 50%) an polar solvents

Suggested Elution Solvents				
Reversed-Phase	Polarity	Ion Exchange Phase	Polarity	Normal Phase
THF Acetone Ethyl acetate Acetonitrile Methanol	Low ↓ High	For complete ionization, sample should be adjusted 2 pH units above or below the analyte pKa. pH can be used to neutralize analyte or sorbent. Use 2% strong acid or base in acetonitrile or methanol.	Low ↓ High	Hexane CH <sub>2</sub> Cl <sub>2</sub> THF Acetone Acetonitrile



## Product Selection Guide by Sample Properties



## Product Selection Guide by Manufacturer

Product Selection Guide by Manufacturer										
SiliCycle SiliaPrep	SiliCycle Part Number	Agilent Bond Elut <sup>®</sup>	Biotage Isolute <sup>®</sup>	Macherey-Nagel Chromabond <sup>®</sup>		Macron Chemicals <sup>®</sup> Bakerbond <sup>®</sup>	Phenomenex Strata <sup>®</sup>	Supelco Discovery <sup>®</sup> and SupelClean <sup>®</sup>	Whatman (GE Healthcare)	Waters Sep-Pak <sup>®</sup>
<b>Non Polar Phases</b>										
SiliaPrep C18 <i>nec</i> (23 %)	SPE-R30130B-xxx		C18							
SiliaPrep C18 (17 %)	SPE-R31930B-xxx	C18	C18 (EC)	C18 ec		Octadecyl (C18)	C18-E	DSC-18 and ENVI-18	ODS-5	tC18
SiliaPrep C18 <i>nec</i> (17 %)	SPE-R35530B-xxx	C18 OH		C18		Light Load Octadecyl	C18-U			
SiliaPrep C18 WPD	SPE-R33229G-xxx		MFC18	C18 ec f			C18-T			C18
SiliaPrep C8	SPE-R31030B-xxx		C8 (EC)			Octyl (C8)	C8	DSC-8 and ENVI-8	C8	C8
SiliaPrep C8 <i>nec</i>	SPE-R31130B-xxx		C8	C8						
SiliaPrep Cyclohexyl	SPE-R61530B-xxx	CH	CH (EC)	C <sub>6</sub> H <sub>11</sub> ec		Cyclohexyl (C <sub>6</sub> H <sub>11</sub> )				
SiliaPrep Phenyl	SPE-R34030B-xxx	PH	PH (EC)	C <sub>6</sub> H <sub>5</sub>		Phenyl (C <sub>6</sub> H <sub>5</sub> )	Phenyl	DSC-Ph and LC-Ph		
<b>Polar Phases</b>										
SiliaPrep Silica	SPE-R10030B-xxx	SI	SI	SiOH		Silica gel (SiOH)	Silica (Si-1)	Silica	SIL	Silica
SiliaPrep Cyano	SPE-R38030B-xxx	Cyano	CN (EC)	CN		Cyano (CN)	Cyano (CN) <sup>b</sup>	DSC-CN and LC-CN		Cyanopropyl
SiliaPrep Diol <i>nec</i>	SPE-R35030B-xxx	Diol (2OH) <sup>b</sup>	DIOL	OH		Diol (COHCOH)		DSC-Diol and LC-Diol		Diolb
SiliaPrep Florisil	SPE-AUT-0014-xxx	Florisil	FL	Florisil		Florisil (Mg <sub>2</sub> SiO <sub>3</sub> )		ENVI-Florisil	FLO	Florisil
SiliaPrep Frorisil PR	SPE-AUT-0015-xxx						Florisil (FL-PR)			
SiliaPrep Alumina Acidic	SPE-AUT-0053-xxx	Alumina A (AL-A)	AL-A	Alox A				LC-Alumina-A		Alumina A
SiliaPrep Alumina Neutral	SPE-AUT-0054-xxx	Alumina N (AL-N)	AL-N	Alox N		Alumina Neutral	Alumina-N (AL-N)	LC-Alumina-N		Alumina N
SiliaPrep Alumina Basic	SPE-AUT-0055-xxx	Alumina B (AL-B)	AL-B	Alox B				LC-Alumina-B		Alumina B
<b>Ion Exchange Phases</b>										
SiliaPrep SAX <i>nec</i>	SPE-R66530B-xxx	SAX <sup>b</sup>	SAX	SB		Quaternary Amine	SAX <sup>b</sup>	DSC-SAX and LC-SAX	SAX	Accell Plus QMA
SiliaPrep SAX-2 <i>nec</i>	SPE-R66430B-xxx	PRS <sup>b</sup>	PE-AX							
SiliaPrep SCX	SPE-R60530B-xxx	SCX <sup>b</sup>	SCX-3 <sup>b</sup>	SA		Aromatic Sulfonic Acid	SCX <sup>b</sup>	DSC-SCX and LC-SCX	SCX <sup>b</sup>	
SiliaPrep SCX-2	SPE-R51230B-xxx		SCX-2 <sup>b</sup>	PSA						
SiliaPrep WAX	SPE-R52030B-xxx	NH <sub>2</sub> <sup>b</sup>	NH <sub>2</sub>	NH <sub>2</sub>		Amino (NH <sub>2</sub> )	NH <sub>2</sub> /WAX <sup>b</sup>	DSC-NH <sub>2</sub> and LC-NH <sub>2</sub> <sup>b</sup>	NH <sub>2</sub> <sup>b</sup>	Aminopropyl
SiliaPrep Diamine (WAX-2)	SPE-R49030B-xxx	PSA <sup>b</sup>	Diamino	Diamino		Diamino (NH <sub>2</sub> NH)		PSA		PSA
SiliaPrep WCX	SPE-R70030B-xxx	CBA	CBA <sup>b</sup>	PCA		Carboxylic Acid (COOH)	WCX <sup>b</sup>	DSC-WCX & LC-WCX		Accell Plus CM
<b>Mixed-Mode and Special Phases</b>										
SiliaPrep C8/SAX-2	SPM-R661230B-xxx	Certify II	HAX				Screen-A	DSC-MCAX		
SiliaPrep SCX-2/SAX	SPM-R802830B-xxx	AccuCAT								
SiliaPrep C8/SCX-2/SAX	SPM-R02802830B-xxx		Multimode				Screen-C <sup>c</sup>			
SiliaPrep CleanDRUG	SPEC-R651230B-xxx	Certify <sup>b</sup>	HCX <sup>d</sup>	Drug 1						
SiliaPrep CleanENVI	SPEC-R31930B-xxx			C18 PAH						
SiliaPrep Activated Carbon	SPE-AUT-0110-xxx	Carbon						ENVI-Carb		AC2
SiliaPrep DL AC/WAX	SP2-R11098-xxx							ENVI-Carb/NH <sub>2</sub>		Carbon Black/Amino
SiliaPrep DL AC/Diamine	SP2-R11007-xxx							ENVI-CarbII/PSA		Carbon Black/PSA
SiliaPrep PCB	SP2-R00650030B-xxx			SA/SiOH						

<sup>a</sup> Mallinkrodt Baker, <sup>b</sup> Non-encapped, <sup>c</sup> Encapped, <sup>d</sup> Ion exchange phase is non-encapped xxx = Formats

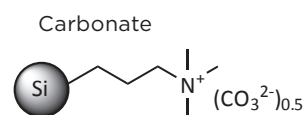
All SiliCycle products are encapped unless noted by « nec » (*non-encapped*)

## SiliaPrep Most Popular Phases

### SiliaPrep Carbonate

#### Description

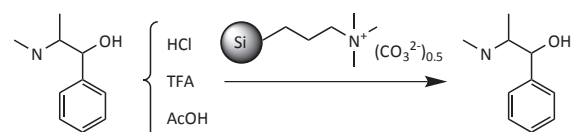
SiliCycle has developed innovative specialty phases in SiliaPrep formats for specific applications, including SiliaPrep Carbonate. It is the silica-bound equivalent of tetramethyl ammonium carbonate, and it can be used as a general base to quench a reaction, free base amines in their ammonium salt form and to scavenge acids, boronic acids and acidic phenols, including HOBt (*widely used in amide coupling reactions*).



### Amine Free Basing Purification

#### General Procedure

1. SiliaPrep Carbonate (2-4 eq. of carbonate in respect to the amine) is conditioned with THF.
2. The amine solution in THF is loaded onto the SiliaPrep Carbonate cartridge.
3. Free salt amine is eluted with THF under gravity.



**Note:** other solvents can be used (methanol, ACN).

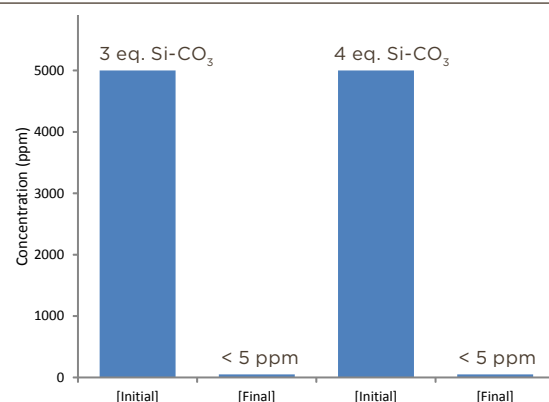
**Related publication:** *Org. Lett.*, 4, 2002, 1167

#### Amine Free Basing Purification Results

Amine Salts		Yield (%) <sup>a</sup>	Purity (%) <sup>b</sup>
Ephedrine•	HCl	98.7	94.4
	TFA	100	98.9
	AcOH	100	99.2

<sup>a</sup>Yield refers to the isolated product, <sup>b</sup>Purity determined by GC-FID

### Scavenging HOBt with SiliaPrep Carbonate



#### SiliaPrep Carbonate SPE Formats

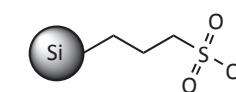
Formats	Qty/Box	SiliaPrep Product Number
<b>SiliaPrep Cartridges</b>		
1 mL/50 mg	100	SPE-R66030B-01B
1 mL/100 mg	100	SPE-R66030B-01C
3 mL/200 mg	50	SPE-R66030B-03G
3 mL/500 mg	50	SPE-R66030B-03P
6 mL/500 mg	50	SPE-R66030B-06P
6 mL/1 g	50	SPE-R66030B-06S
6 mL/2 g	50	SPE-R66030B-06U
12 mL/2 g	20	SPE-R66030B-12U
25 mL/5 g	20	SPE-R66030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>		
10 mL/200 mg	50	SPC-R66030B-10G
10 mL/500 mg	50	SPC-R66030B-10P
<b>SiliaPrep 96-Well Plates</b>		
2 mL/50 mg	1	96W-R66030B-B
2 mL/100 mg	1	96W-R66030B-C

## SiliaPrep Propylsulfonic acid and Tonic Acid

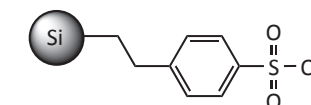
#### Description

SiliCycle offers SiliaBond Propylsulfonic Acid (*Si-SCX-2*) and SiliaBond Tonic Acid (*Si-SCX*). Both are considered strong cation exchangers, as they maintain a negative charge throughout the pH scale. The aromatic ring of the SiliaBond Tonic Acid makes it slightly more acidic than the other. However, tests have demonstrated that they both have comparable strengths. The most common use is probably as a strong cation exchanger for amine "catch and release" purification in SPE cartridges.

Propylsulfonic Acid (SCX-2)



Tonic Acid (SCX)



### Catch and Release Amine Purification

#### General procedure

The amine (1 eq.) was dissolved in methanol (2,500 ppm)

1. Cartridge was conditioned with methanol
2. Cartridge was loaded with the amine.
3. Cartridge was then washed with CH<sub>3</sub>OH (1 mL/min)
4. Finally, the amine was released by 2 M ammonia/methanol

#### Catch and Release Results

Amine	# eq.	SiliaPrep SCX-2		SiliaPrep SCX	
		Catch (%) <sup>a</sup>	Release <sup>b</sup>	Catch (%) <sup>a</sup>	Release <sup>b</sup>
Tributylamine	2	98	90	98	97
Aniline	2	100	100	100	100
2-Aminothiazole	4	100	100	100	100
4-Nitroaniline	4	100	100	100	100

<sup>a</sup> Determined from the initial solution. <sup>b</sup> Determined by (GC-FID) analysis of isolated product

#### SiliaPrep SPE Formats

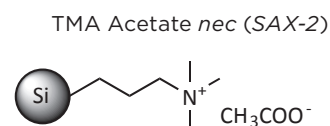
Formats	Qty/Box	SiliaPrep Propylsulfonic Acid	SiliaPrep Tonic Acid
<b>SiliaPrep Cartridges</b>			
1 mL/50 mg	100	SPE-R51230B-01B	SPE-R60530B-01B
1 mL/100 mg	100	SPE-R51230B-01C	SPE-R60530B-01C
3 mL/200 mg	50	SPE-R51230B-03G	SPE-R60530B-03G
3 mL/500 mg	50	SPE-R51230B-03P	SPE-R60530B-03P
6 mL/500 mg	50	SPE-R51230B-06P	SPE-R60530B-06P
6 mL/1 g	50	SPE-R51230B-06S	SPE-R60530B-06S
6 mL/2 g	50	SPE-R51230B-06U	SPE-R60530B-06U
12 mL/2 g	20	SPE-R51230B-12U	SPE-R60530B-12U
25 mL/5 g	20	SPE-R51230B-20X	SPE-R60530B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>			
10 mL/200 mg	50	SPC-R51230B-10G	SPC-R60530B-10G
10 mL/500 mg	50	SPC-R51230B-10P	SPC-R60530B-10P
<b>SiliaPrep - 96 Well Plates</b>			
2 mL/50 mg	1	96W-R51230B-B	96W-R60530B-B
2 mL/100 mg	1	96W-R51230B-C	96W-R60530B-C

## SiliaPrep TMA Acetate nec (SAX-2)

### Description

Strong anion exchangers (SAX) have been widely used in both chromatography and ion exchange SPE to selectively bind acidic drugs and/or analytes. In particular, weakly acidic compounds can be effectively extracted as SAX sorbents retain a permanent positive charge across the pH range.

Silicycle has developed SiliaBond TMA Acetate nec (Si-SAX-2), a strong anion exchange sorbent with a low-selectivity acetate counter ion already in place. Typical loading is 1.00 mmol/g, which is higher than available equivalents. This sorbent more favorably retains acidic compounds with pKas < 5, such as carboxylic acids. This property can be used in organic chemistry applications to selectively purify acidic compounds or remove acidic impurities from reaction mixtures.

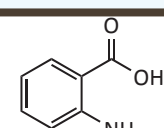
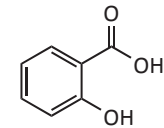
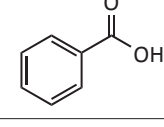
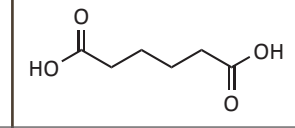
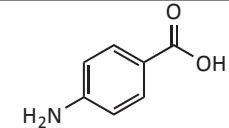


## Catch and Release of Acidic Compounds

### General procedure

SiliaPrep TMA Acetate nec 2 g/6 mL (SPE-R66430B-06U) Solutions containing 1 and 2 mmol of acidic compounds in methanol were investigated.

1. Cartridge was conditioned with methanol.
2. Cartridge was loaded with the acidic solution.
3. Cartridge was then washed with methanol to remove any impurities.
4. The acid was released using a 10 mL solution of acetic acid in methanol or acetonitrile.

Catch and Release Purification Results			
pKa	Acid	Recovery (%) <sup>a</sup>	
		1 mmol	2 mmol
2.1		100	99
3.0		88	83
4.2		100	100
4.4		99	91
4.9		90	83

<sup>a</sup> Determined from the isolated product

## Separation of Acids Based on pKa Results

### General Procedure

A solution containing equimolar quantities of phenol, benzoic acid and salicylic acid in methanol was prepared. The solution was loaded onto a SiliaPrep TMA Acetate nec 2 g/6 mL cartridge (SPE-R66430B-06U). The phenol is not retained and a simple wash with methanol allows the isolation of the clean product. Elution with a 2% solution of acetic acid in methanol allowed the isolation of clean benzoic acid. Finally a 2% solution of HCl in acetonitrile was required to isolate clean salicylic acid. All yields were above 90% as indicated in table below.

### Separation of Acids Based on pKa Results

Compounds	Salicylic Acid	Benzoic Acid	Phenol
pKa	3.0	4.2	10.0
Initial Amount (mg)	103	92	70
Isolated Amount (mg)	102	88	65
Recovery (%) <sup>a</sup>	99	96	93

<sup>a</sup>Recovery measured from isolated product

### SiliaPrep TMA Acetate nec SPE Formats

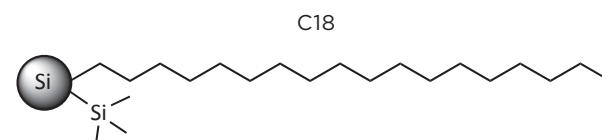
Formats	Qty/Box	SiliaPrep Product Number
<b>SiliaPrep Cartridges</b>		
1 mL/50 mg	100	SPE-R66430B-01B
1 mL/100 mg	100	SPE-R66430B-01C
3 mL/200 mg	50	SPE-R66430B-03G
3 mL/500 mg	50	SPE-R66430B-03P
6 mL/500 mg	50	SPE-R66430B-06P
6 mL/1 g	50	SPE-R66430B-06S
6 mL/2 g	50	SPE-R66430B-06U
12 mL/2 g	20	SPE-R66430B-12U
25 mL/5 g	20	SPE-R66430B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>		
10 mL/200 mg	50	SPC-R66430B-10G
10 mL/500 mg	50	SPC-R66430B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>		
300 mg	50	SPS-R66430B-J
600 mg	50	SPS-R66430B-Q
900 mg	50	SPS-R66430B-R
<b>SiliaPrep 96-Well Plates</b>		
2 mL/50 mg	1	96W-R66430B-B
2 mL/100 mg	1	96W-R66430B-C

## SiliaPrep Reversed-Phases

### Description

#### SiliaPrep C18

SiliCycle recently developed a new and innovative C18 phase characterized by a homogeneous coverage of the silane on the surface. Consequently the endcapping step is well controlled, improving the separation and inhibiting specific interactions with silanol groups (*highly deactivated silanol phase*). This strongly hydrophobic and non-polar sorbent is used to extract acidic, neutral and basic compounds from aqueous solutions, various organic compounds from water, and drugs and metabolites from physiological fluids.

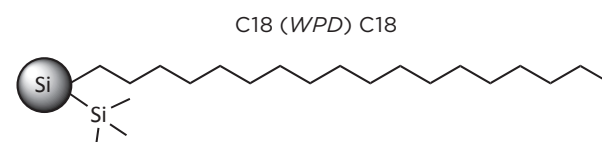


- SiliCycle Sorbent Number: R31930B
- Loading: 17 %C
- Endcapping: Yes
- Silica type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

### Description

#### SiliaPrep C18 (WPD)

This strongly hydrophobic, non-polar and high-loading capacity sorbent is similar to SiliaPrep C18 but can accommodate larger molecules and untreated matrices.

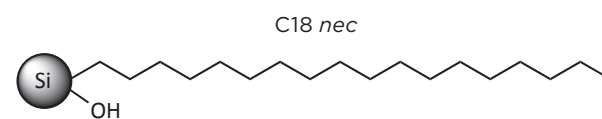


- SiliCycle Sorbent Number: R33229G
- Loading: 13 %C
- Endcapping: Yes
- Silica type: 125 Å, 300 m<sup>2</sup>/g, 37 - 55 µm

### Description

#### SiliaPrep C18 nec

This strongly hydrophobic and non-polar sorbent is similar to SiliaPrep C18, but presents higher retention and polar selectivity for basic compounds. Unreacted surface OH's can be used for soft condition catch and release purification of glucuronides.



- SiliCycle Sorbent Number: R35530B
- Loading: 17 %C
- Endcapping: No
- Silica type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

## SiliaPrep Reversed-Phases C18

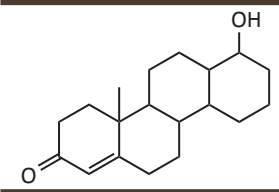
### SiliaPrep SPE Formats

Formats	Qty/Box	SiliaPrep C18	SiliaPrep C18 WPD	SiliaPrep C18 nec
<b>SiliaPrep Cartridges</b>				
1 mL/50 mg	100	SPE-R31930B-01B	SPE-R33229G-01B	SPE-R35530B-01B
1 mL/100 mg	100	SPE-R31930B-01C	SPE-R33229G-01C	SPE-R35530B-01C
3 mL/200 mg	50	SPE-R31930B-03G	SPE-R33229G-03G	SPE-R35530B-03G
3 mL/500 mg	50	SPE-R31930B-03P	SPE-R33229G-03P	SPE-R35530B-03P
6 mL/500 mg	50	SPE-R31930B-06P	SPE-R33229G-06P	SPE-R35530B-06P
6 mL/1 g	50	SPE-R31930B-06S	SPE-R33229G-06S	SPE-R35530B-06S
6 mL/2 g	50	SPE-R31930B-06U	SPE-R33229G-06U	SPE-R35530B-06U
12 mL/2 g	20	SPE-R31930B-12U	SPE-R33229G-12U	SPE-R35530B-12U
25 mL/5 g	20	SPE-R31930B-20X	SPE-R33229G-20X	SPE-R35530B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R31930B-10G	SPC-R33229G-10G	SPC-R35530B-10G
10 mL/500 mg	50	SPC-R31930B-10P	SPC-R33229G-10P	SPC-R35530B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>				
300 mg	50	SPS-R31930B-J	SPS-R33229G-J	SPS-R35530B-J
600 mg	50	SPS-R31930B-Q	SPS-R33229G-Q	SPS-R35530B-Q
900 mg	50	SPS-R31930B-R	SPS-R33229G-R	SPS-R35530B-R
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R31930B-B	96W-R33229G-B	96W-R35530B-B
2 mL/100 mg	1	96W-R31930B-C	96W-R33229G-C	96W-R35530B-C

## Determination of Testosterone in Human Urine

### General Procedure

1. Mini-SiliaPrep C18 (PN: SPS-R33229G-J) was conditioned with 5 mL of methanol and 5 mL of H<sub>2</sub>O.
2. The urine sample (2 mL) was then slowly aspirated through the cartridge.
3. Cartridge was washed with 5 mL of H<sub>2</sub>O and 5 mL of hexane.
4. Analyte was eluted with 5 mL of methanol.
5. The sample was evaporated under a nitrogen stream for 30 min at 40 °C.
6. The analyte was derivatized using 800 QL of Girard-P (100 mM ammonium acetate buffer, pH 4.2) and 200 QL of methanol maintained at room temperature for 12 h.
7. Quantification was done using LC-MS/MS apparatus.

Testosterone Recovery		
Testosterone	Recovery (%) <sup>a</sup>	
	lot #1	lot #2
	94 ± 2	96 ± 1

<sup>a</sup>Mean Recovery N = 3, 250 ng/mL

## SiliaPrep Reversed-Phase sorbents

### Description

#### SiliaPrep C8

A moderately hydrophobic and non-polar sorbent used to extract extremely non-polar compounds. This phase is more selective than SiliaPrep C18 for big compounds such as PAH, vitamin D, and oils as well as greasy compounds.

- SiliCycle Sorbent Number: R31030B
- Loading: 12 %C
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

### Description

#### SiliaPrep Phenyl

A moderately hydrophobic and non-polar sorbent used to extract non-polar compounds with different selectivities through π-π interactions including aromatic compounds and other non-polar phases.

- SiliCycle Sorbent Number: R34030B
- Loading: 9 %C
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

### Description

#### SiliaPrep Cyano

A moderately polar sorbent used as a normal phase (*less polar compared to silica*) to extract acidic, basic and neutral compounds from aqueous solutions. It is also used as a reversed-phase (*less hydrophobic than C8 and C18*).

- SiliCycle Sorbent Number: R38030B
- Loading: 7 %C
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

### SiliaPrep SPE Formats

Formats	Qty/Box	SiliaPrep C8	SiliaPrep Phenyl	SiliaPrep Cyano
<b>SiliaPrep Cartridges</b>				
1 mL/50 mg	100	SPE-R31030B-01B	SPE-R34030B-01B	SPE-R38030B-01B
1 mL/100 mg	100	SPE-R31030B-01C	SPE-R34030B-01C	SPE-R38030B-01C
3 mL/200 mg	50	SPE-R31030B-03G	SPE-R34030B-03G	SPE-R38030B-03G
3 mL/500 mg	50	SPE-R31030B-03P	SPE-R34030B-03P	SPE-R38030B-03P
6 mL/500 mg	50	SPE-R31030B-06P	SPE-R34030B-06P	SPE-R38030B-06P
6 mL/1 g	50	SPE-R31030B-06S	SPE-R34030B-06S	SPE-R38030B-06S
6 mL/2 g	50	SPE-R31030B-06U	SPE-R34030B-06U	SPE-R38030B-06U
12 mL/2 g	20	SPE-R31030B-12U	SPE-R34030B-12U	SPE-R38030B-12U
25 mL/5 g	20	SPE-R31030B-20X	SPE-R34030B-20X	SPE-R38030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R31030B-10G	SPC-R34030B-10G	SPC-R38030B-10G
10 mL/500 mg	50	SPC-R31030B-10P	SPC-R34030B-10P	SPC-R38030B-10P
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R31030B-B	96W-R34030B-B	96W-R38030B-B
2 mL/100 mg	1	96W-R31030B-C	96W-R34030B-C	96W-R38030B-C

## SiliaPrep Normal Phases

### Description

#### SiliaPrep Silica

The most polar sorbent, which presents a slightly acidic character and is used to extract various compounds from non-polar solvents through hydrogen bonding. This sorbent is also used for the efficient

separation of analytes with similar structures and for removing the baseline noise from organic samples.

- SiliCycle Sorbent Number: R10030B
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

### Description

#### SiliaPrep Florisil

A polar sorbent (*MgO<sub>3</sub>Si*) presenting a basic character used to extract non-polar to moderately polar compounds from non-polar solvents. The magnesium ion allows retention of chlorinated

pesticides, polychlorinated biphenyl (*PCB*'s) and polysaccharides.

- SiliCycle Sorbent Number: AUT-0014

### Description

#### SiliaPrep Alumina-Acidic, Neutral and Basic

Alumina can present either cationic, neutral and acidic character. It is used in a similar fashion as for the SiliaPrep Silica. The difference is that Alumina is more stable at high pH than silica. These sorbents present favorable retention of aromatic

compounds, aliphatic amines and compounds containing electronegative functions.

- SiliCycle Sorbent Number: Acidic: AUT-0053, Neutral: AUT-0054, Basic: AUT-0055
- Alumina Type: 60 Å, 0.9 g/mL, 50 - 200 µm

### SiliaPrep SPE Formats

Formats	Qty/Box	SiliaPrep Silica	SiliaPrep Florisil	SiliaPrep Acidic Alumina	SiliaPrep Neutral Alumina	SiliaPrep Basic Alumina
<b>SiliaPrep Cartridges</b>						
1 mL/50 mg	100	SPE-R10030B-01B	SPE-AUT-0014-01B	SPE-AUT-0053-01B	SPE-AUT-0054-01B	SPE-AUT-0055-01B
1 mL/100 mg	100	SPE-R10030B-01C	SPE-AUT-0014-01C	SPE-AUT-0053-01C	SPE-AUT-0054-01C	SPE-AUT-0055-01C
3 mL/200 mg	50	SPE-R10030B-03G	SPE-AUT-0014-03G	SPE-AUT-0053-03G	SPE-AUT-0054-03G	SPE-AUT-0055-03G
3 mL/500 mg	50	SPE-R10030B-03P	SPE-AUT-0014-03P	SPE-AUT-0053-03P	SPE-AUT-0054-03P	SPE-AUT-0055-03P
6 mL/500 mg	50	SPE-R10030B-06P	SPE-AUT-0014-06P	SPE-AUT-0053-06P	SPE-AUT-0054-06P	SPE-AUT-0055-06P
6 mL/1 g	50	SPE-R10030B-06S	SPE-AUT-0014-06S	SPE-AUT-0053-06S	SPE-AUT-0054-06S	SPE-AUT-0055-06S
6 mL/2 g	50	SPE-R10030B-06U	SPE-AUT-0014-06U	SPE-AUT-0053-06U	SPE-AUT-0054-06U	SPE-AUT-0055-06U
12 mL/2 g	20	SPE-R10030B-12U	SPE-AUT-0014-12U	SPE-AUT-0053-12U	SPE-AUT-0054-12U	SPE-AUT-0055-12U
25 mL/5 g	20	SPE-R10030B-20X	SPE-AUT-0014-20X	SPE-AUT-0053-20X	SPE-AUT-0054-20X	SPE-AUT-0055-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>						
10 mL/200 mg	50	SPC-R10030B-10G	SPC-AUT-0014-10G	SPC-AUT-0053-10G	SPC-AUT-0054-10G	SPC-AUT-0055-10G
10 mL/500 mg	50	SPC-R10030B-10P	SPC-AUT-0014-10P	SPC-AUT-0053-10P	SPC-AUT-0054-10P	SPC-AUT-0055-10P
<b>Mini-SiliaPrep SPE Cartridges</b>						
300 mg	50	SPS-R10030B-J	SPS-AUT-0014-J	SPS-AUT-0053-J	SPS-AUT-0054-J	SPS-AUT-0055-J
600 mg	50	SPS-R10030B-Q	SPS-AUT-0014-Q	SPS-AUT-0053-Q	SPS-AUT-0054-Q	SPS-AUT-0055-Q
900 mg	50	SPS-R10030B-R	SPS-AUT-0014-R	SPS-AUT-0053-R	SPS-AUT-0054-R	SPS-AUT-0055-R
<b>SiliaPrep 96-Well Plates</b>						
2 mL/50 mg	1	96W-R10030B-B	96W-AUT-0014-B	N.A.	N.A.	N.A.
2 mL/100 mg	1	96W-R10030B-C	96W-AUT-0014-C	N.A.	N.A.	N.A.

## SiliaPrep Ion Exchange Phases

### Description

#### SiliaPrep TMA Chloride (Si-SAX)

Strong anion exchanger sorbent positively charged under all conditions. Used to extract acidic molecules ( $pK_a$  3 - 5).

- SiliCycle Sorbent Number: R66530B
- Loading: 1.1 mmol/g
- Endcapping: No
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 μm

### Description

#### SiliaPrep Carboxylic Acid (Si-WCX)

A weak cation exchanger sorbent used to extract strong basic compounds ( $pK_a$  > 9).

- SiliCycle Sorbent Number: R70030B
- Loading: 1.4 mmol/g
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 μm

### Description

#### SiliaPrep Amine (Si-WAX)

A weak anion exchanger used instead of a strong anion exchanger for strong anions, thus avoiding irreversible retention (*acidic molecules*  $pK_a$  < 3). This sorbent is utilized in different applications such as the separation of peptides, drugs and metabolites from physiological fluids, poly- and monosaccharides and structural isomers.

- SiliCycle Sorbent Number: R52030B
- Loading: 1.6 mmol/g
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 μm

### SiliaPrep SPE Formats

Formats	Qty/Box	SiliaPrep TMA Chloride	SiliaPrep Carboxylic Acid	SiliaPrep Amine
<b>SiliaPrep Cartridges</b>				
1 mL/50 mg	100	SPE-R66530B-01B	SPE-R70030B-01B	SPE-R52030B-01B
1 mL/100 mg	100	SPE-R66530B-01C	SPE-R70030B-01C	SPE-R52030B-01C
3 mL/200 mg	50	SPE-R66530B-03G	SPE-R70030B-03G	SPE-R52030B-03G
3 mL/500 mg	50	SPE-R66530B-03P	SPE-R70030B-03P	SPE-R52030B-03P
6 mL/500 mg	50	SPE-R66530B-06P	SPE-R70030B-06P	SPE-R52030B-06P
6 mL/1 g	50	SPE-R66530B-06S	SPE-R70030B-06S	SPE-R52030B-06S
6 mL/2 g	50	SPE-R66530B-06U	SPE-R70030B-06U	SPE-R52030B-06U
12 mL/2 g	20	SPE-R66530B-12U	SPE-R70030B-12U	SPE-R52030B-12U
25 mL/5 g	20	SPE-R66530B-20X	SPE-R70030B-20X	SPE-R52030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R66530B-10G	SPC-R70030B-10G	SPC-R52030B-10G
10 mL/500 mg	50	SPC-R66530B-10P	SPC-R70030B-10P	SPC-R52030B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>				
300 mg	50	SPS-R66530B-J	SPS-R70030B-J	SPS-R52030B-J
600 mg	50	SPS-R66530B-Q	SPS-R70030B-Q	SPS-R52030B-Q
900 mg	50	SPS-R66530B-R	SPS-R70030B-R	SPS-R52030B-R
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R66530B-B	96W-R70030B-B	96W-R52030B-B
2 mL/100 mg	1	96W-R66530B-C	96W-R70030B-C	96W-R52030B-C

## SiliaPrep Mixed Mode Phases

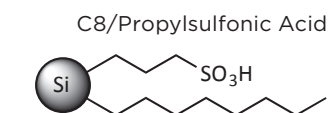
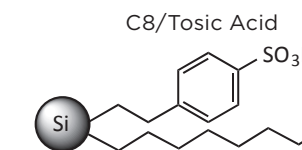
### Description

#### SiliaPrep C8/Tosic Acid

#### SiliaPrep C8/Propylsulfonic Acid

These sorbents are used to extract basic compounds from aqueous solutions, typically drugs and metabolites from physiological fluids.

- SiliCycle Sorbent Number: C8/SCX: R023830B and C8/SCX-2: R028030B
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 μm

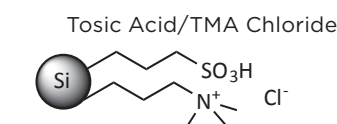


### Description

#### SiliaPrep Tosic Acid/TMA Chloride

This sorbent is typically used for the separation of acidic and basic molecules from non-ionizable molecules.

- SiliCycle Sorbent Number: R802830B
- Endcapping: Yes
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 μm



### SiliaPrep SPE Formats

Formats	Qty/Box	SiliaPrep C8/SCX	SiliaPrep C8/SCX-2	SiliaPrep SCX/SAX
<b>SiliaPrep Cartridges</b>				
1 mL/50 mg	100	SPE-R023830B-01B	SPE-R028030B-01B	SPE-R802830B-01B
1 mL/100 mg	100	SPE-R023830B-01C	SPE-R028030B-01C	SPE-R802830B-01C
3 mL/200 mg	50	SPE-R023830B-03G	SPE-R028030B-03G	SPE-R802830B-03G
3 mL/500 mg	50	SPE-R023830B-03P	SPE-R028030B-03P	SPE-R802830B-03P
6 mL/500 mg	50	SPE-R023830B-06P	SPE-R028030B-06P	SPE-R802830B-06P
6 mL/1 g	50	SPE-R023830B-06S	SPE-R028030B-06S	SPE-R802830B-06S
6 mL/2 g	50	SPE-R023830B-06U	SPE-R028030B-06U	SPE-R802830B-06U
12 mL/2 g	20	SPE-R023830B-12U	SPE-R028030B-12U	SPE-R802830B-12U
25 mL/5 g	20	SPE-R023830B-20X	SPE-R028030B-20X	SPE-R802830B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R023830B-10G	SPC-R028030B-10G	SPC-R802830B-10G
10 mL/500 mg	50	SPC-R023830B-10P	SPC-R028030B-10P	SPC-R802830B-10P
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R023830B-B	96W-R028030B-B	96W-R802830B-B
2 mL/100 mg	1	96W-R023830B-C	96W-R028030B-C	96W-R802830B-C

## SiliaPrep CleanDRUG

### Description

#### SiliaPrep CleanDRUG:

SiliaPrep CleanDRUG, a new line of solid phase extraction (SPE) products, is designed to extract specific analytes with more reproducibility and efficiency when using sensitive detectors. This product was developed, tested, and quality controlled for drugs of abuse applications.

- SiliCycle Sorbent Number: R651230B
- Silica Type: 60 Å, 500 m<sup>2</sup>/g, 40 - 63 µm

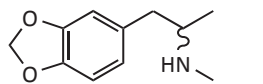
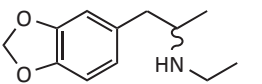
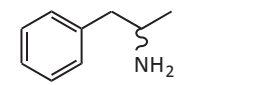
### Easy SPE Method for Drugs of Abuse Determination in Human Urine

#### General Procedure

1. Sample (0.5 mL) is mixed with 2.5 mL of aqueous H<sub>2</sub>SO<sub>4</sub> (0.1 M).
2. SiliaPrep CleanDRUG (PN: SPE-R651230B-03G) is conditioned with 2 column volumes of methanol, then 2 column volumes of aqueous H<sub>2</sub>SO<sub>4</sub> (0.1 M).
3. Slowly force or aspirate the sample of urine through the cartridge.
4. Wash the cartridge with 3 mL of phosphate buffer (KH<sub>2</sub>PO<sub>4</sub>/K<sub>2</sub>HPO<sub>4</sub> pH = 7.0), then with 3 mL of aqueous H<sub>2</sub>SO<sub>4</sub> 0.1 M, and finally with 3 mL of methanol.
5. Analyte is eluted with 2 x 3 mL of aqueous NH<sub>4</sub>OH (5% v/v).
6. Sample is evaporated under a nitrogen stream and, reconstituted with distilled water and methanol (9:1 v/v). Finally, the quantification is done using LC-MS apparatus.

SiliaPrep CleanDRUG SPE Formats		
Formats	Qty/Box	SiliaPrep Product Number
<b>SiliaPrep Cartridges</b>		
1 mL/50 mg	100	SPEC-R651230B-01B
1 mL/100 mg	100	SPEC-R651230B-01C
3 mL/200 mg	50	SPEC-R651230B-03G
3 mL/500 mg	50	SPEC-R651230B-03P
6 mL/500 mg	50	SPEC-R651230B-06P
6 mL/1 g	50	SPEC-R651230B-06S
6 mL/2 g	50	SPEC-R651230B-06U
12 mL/2 g	20	SPEC-R651230B-12U
25 mL/5 g	20	SPEC-R651230B-20X

#### Drugs of Abuse Recovery

Drugs			
Recovery (%) <sup>a</sup>	96	98	99

<sup>a</sup>Mean Recovery N = 2, 10 mg/mL to 100 mg/mL



**Contact Us**  
Order Now

## Ordering Information

### Quote Form

#### General Information

Company: .....

SiliCycle Customer Number (if known): .....

Contact Name: .....

E-mail address: .....

Tel: ..... Fax: .....

Address Information .....

.....

Department: .....

Address: .....

ZIP/Postal Code: .....

Country: .....

Quote Request		
Part Number	Product Description	Request Quantity

#### Confirm this request by

- FAX
- E-mail
- Phone

#### Comments

.....

.....

.....

.....

## Information Request Form

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> <b>Metal Scavengers</b>       | <input type="checkbox"/> <b>Catalysts</b>                               | <input type="checkbox"/> <b>Oxidants</b>                               |
| Metal of interest: .....                               | <input type="checkbox"/> Silia <i>Cat</i> catalysts                     | <input type="checkbox"/> Silia <i>Cat</i> oxidant                      |
| .....  | <input type="checkbox"/> Silia <i>Bond</i> catalysts                    | <input type="checkbox"/> Silia <i>Bond</i> oxidants                    |
| .....  | <input type="checkbox"/> Silia <i>Cat</i> + Silia <i>Bond</i> catalysts | <input type="checkbox"/> Silia <i>Cat</i> + Silia <i>Bond</i> oxidants |
| .....  |   |  |
| <input type="checkbox"/> <b>Organic scavengers</b>     | <input type="checkbox"/> <b>SiliaBond Reagents</b>                      | <input type="checkbox"/> <b>Others</b>                                 |
| <input type="checkbox"/> Nucleophile scavengers        | <input type="checkbox"/> Reaction of interest                           | <input type="checkbox"/> .....   |
| <input type="checkbox"/> Electrophile scavengers       | <input type="checkbox"/> .....  | <input type="checkbox"/> .....   |
| <input type="checkbox"/> Genotoxic scavengers          | <input type="checkbox"/> .....  | <input type="checkbox"/> .....   |
|  | <input type="checkbox"/> .....  | <input type="checkbox"/> .....   |
| <input type="checkbox"/> <b>Chromatographic phases</b> | <input type="checkbox"/> <b>HPLC Columns</b>                            | <input type="checkbox"/> <b>Application notes in</b>                   |
| <input type="checkbox"/> Reversed phases               | <input type="checkbox"/> Reversed phases                                | <input type="checkbox"/> Bulk  |
| <input type="checkbox"/> Normal phases                 | <input type="checkbox"/> Normal phases                                  | <input type="checkbox"/> SPE cartridges                                |
| <input type="checkbox"/> Fluorous phases               | <input type="checkbox"/> Ion exchangers                                 | <input type="checkbox"/> Flash cartridges                              |
| <input type="checkbox"/> Ion exchangers                | <input type="checkbox"/> Chiral phases                                  |  |

#### General Information

Company: .....

SiliCycle Customer Number (if known): .....

Contact Name: .....

E-mail address: .....

Tel: ..... Fax: .....

Address Information .....

.....

Department: .....

Address: .....

ZIP/Postal Code: .....

Country: .....

#### Comments

.....

.....

..... Please Copy and Fax this form to SiliCycle Inc. at **418-874-0355**

## Order Form

### General Information

Company: .....  
 SiliCycle Client Number: ..... Purchase Order Number: .....  
 Contact Name: .....  
 E-mail address: .....  
 Tel: Fax: .....

### Payment Details

### Verification Code\*

Credit card number: ..... \*The 3 last numbers in the back side of your card  
 Expiry date: .....  
 Name as it appears on card: .....  
 VISA  Master Card  Amex

### Address Information for the Shipment

Department: .....  
 Address: .....  
 ZIP/Postal Code: .....  
 Country: .....

SiliCycle Products				
Part Number	Product Description	Packaging (g, Kg, box)	Quantity	Price (USD)

### Confirm this request by

- FAX
- E-mail
- Phone

### Comments

.....  
 ..... Please Copy and Fax this form to SiliCycle Inc. at **418-874-0355**

## Ordering Information

### How to order

You can order any SiliCycle product on-line through the new SiliCycle e-commerce website: [www.silicycle.com](http://www.silicycle.com).

You can also order any product from this catalog, 365 days or nights a year. We hope you will enjoy this new and friendly way to order SiliCycle products.

Orders can also be placed by phone, fax, mail or e-mail. You will find an order form on page 222 of this catalog for fax (1 418.874.0355) and mail (SiliCycle headquarters address at the bottom of this page) orders. If you prefer, you can reach us by e-mail ([info@silicycle.com](mailto:info@silicycle.com)) or by phone (1 418.874.0054 or Toll free for North America only 1 877.745.4292). Please have the following information on hand:

- Your name
- Company name, billing and shipping address
- Purchase order number
- Credit card information
- Catalog number and product description
- Size, quantity and unit of measure
- E.I.N. or F.I.N .for United States clients

### Technical Support

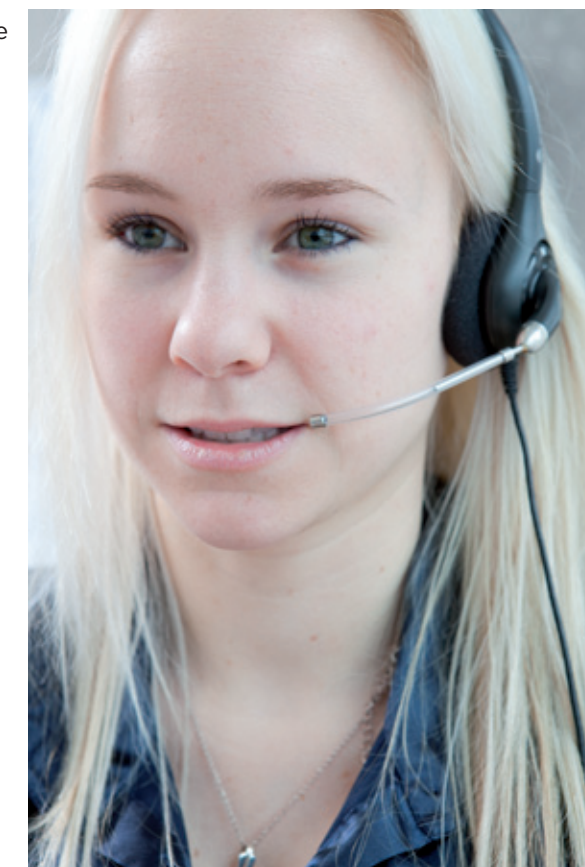
At SiliCycle, we are committed to providing the best technical support possible. Our worldwide Technical Support Group is comprised of a team of highly qualified M.Sc., Engineers and PhD Chemists, Technical Support Professionals and Service Coordinators who are prepared to troubleshoot, answer questions, and provide solutions for your service and applications needs.

In order to better respond to your technical inquiries, feel free to contact us in three different ways:

- E-mail: [support@silicycle.com](mailto:support@silicycle.com)
- Phone: International 1 418.874.0054
- Canada USA 1 877.745.4292 (Toll-Free)
- Online forum at [www.SiliCycle.com](http://www.SiliCycle.com)

### SiliCycle headquarters address:

2500, Parc-Technologique Blvd  
 Quebec City, Quebec  
 G1P 4S6, CANADA



## Terms and Conditions

### General

Unless otherwise stated, all transactions are expressly subject to these Terms and Conditions. Modifications or additions will be recognized only if accepted in writing by an officer of SiliCycle Inc. (*hereinafter named SiliCycle*), or an officially designated representative. Provisions of Buyer's Purchase Order or other documents that add to or differ from these Terms and Conditions are expressly rejected. No waiver of these Terms and Conditions or acceptance of others shall be construed as failure of the Company to raise objections.

### Privacy Policy

Because your clientele is our most vital asset, we take privacy very seriously and won't share your personal information with anyone. Your information is used only to personalize your profile and to facilitate the transaction. You can change or update your information at any time.

### Quotation and Published Prices

Quotations automatically expire 30 calendar days from the date issued unless otherwise stated. Quotes are subject to withdrawal with notice within that period. Prices shown on the published price lists and other published literature issued by SiliCycle are not unconditional offers to sell, and are subject to change without notice.

### Warranty

SiliCycle guarantees to the original Buyer that the products sold conform to the composition and purity described therein at the time of their shipment. The Buyer's sole remedy in the event that SiliCycle fails to meet said warranty shall be the replacement of the unused portion of the product(s), or if approved by SiliCycle, a refund (*at the purchase price*) provided that the Buyer returns the alleged non-conforming product(s) within 30 days after reception of product(s). SiliCycle makes no other guarantee of suitability for a particular purpose or of the merchantability in the use or handling of the product, and does not accept any liability for consequential, special, indirect or incidental damages resulting therefrom.

### Changes

The Buyer may, with the express written consent of SiliCycle, make changes in the specifications for products or work covered by the contract. In such an event, the contract price and delivery dates shall be equitably adjusted. SiliCycle shall be entitled to payment for reasonable profit plus costs and expenses incurred by work and materials rendered unnecessary as a result of such changes and for work and materials required to effect said changes.

If the Buyer has made a mistake on his/her purchase order, and the material has already been shipped and received, SiliCycle may approve the exchange of said material (*if price is identical*); however the Buyer will be responsible for all shipping costs. See return authorization policy section on the next page to obtain a return merchandise authorization form prior to returning goods.

### Cancellation

Undelivered parts of any order may be cancelled by the Buyer only with the written approval of SiliCycle. If the Buyer makes an assignment for the benefit of creditors, or in the event that SiliCycle, for any reason feels insecure about Buyer's willingness or ability to perform, SiliCycle shall have the unconditional right to cancel the sales transaction or demand full or partial payment.

In the event of any cancellation of this order by either party, the Buyer shall pay SiliCycle for reasonable costs and expenses incurred by the SiliCycle prior to receipt of the cancellation notice, plus SiliCycle's usual rate of profit for similar work.

### Taxes

The Company's prices do not include any applicable sales, goods and services, use, excise or similar taxes and the amount of any such tax SiliCycle may be required to pay or collect will be added to each invoice and paid by the Buyer.

### Terms of Payment

All merchandise purchased remains the property of SiliCycle until such time as all invoices for the merchandise have been paid in full. Except for purchases paid online, or unless explicitly stated elsewhere in writing, terms are cash net 30 days from date of invoice. Additional fees of 2% per month (26.8% per year) will accrue on all accounts past due. If any payment is in default, and it becomes necessary to hire a recovery agency or lawyer, the client accepts to pay, in addition to the outstanding balance, recovery fees equal to 20% of the balance in capital and interests. By reason of the financial condition of Buyer or otherwise, SiliCycle may require full or partial payment in advance.

Certain orders may require a deposit or progressive payments as referenced in the quote. Such deposits may be increased upon receipt of purchase order based upon the Buyer's most current credit rating. Subject to the warranties stated in this policy, all sales are final without right of return.

### Return Policy

Our Customer Service Department is available to assist you at any time should a problem arise with your order. Please make sure to inspect your packages immediately upon receipt and notify us within the next two (2) business days of any damage and/or discrepancies. Should a product be sent to you incorrectly, as the result of an error on our part, we will take quick and appropriate action to correct the problem at no charge to you.

In order to maintain the quality of our products and continue to provide competitive prices, some products may not be returned for credit. SiliCycle will not grant credit for:

- (i) Shelf-worn, used or defaced products;
- (ii) Scavengers, reagents, catalysts, or any other bounded silica whose containers have been opened;
- (iii) Products that are personalized or customized;
- (iv) Refrigerated or temperature-controlled products;
- (v) Products that have been discontinued;
- (vi) Products not directly purchased from SiliCycle

Products sold in distribution by SiliCycle will be subject to the Terms and Conditions Policy of the respective manufacturer.

Prior to any return, an authorization and a return material authorization (RMA) number must be obtained from our Customer Service Department. Shipping instructions will also be provided at this point. The RMA will ensure the safe and proper handling of material; it should therefore be referenced on all shipping labels.

The Buyer has 30 days from the issuance of the RMA to return the goods. Returns made without an authorization number will not be accepted and will be returned to the Buyer.

Returns are subject to a 50% restocking and/or disposal fee.

### Shipping Policy

SiliCycle uses a two-day or five-day delivery (or equivalent) depending on weight and availability of product. Standard overnight delivery can also be arranged. Freight charges are prepaid and added to the invoice unless special instructions are requested by the customer. These conditions apply to all North American shipments. International delivery delays will vary according to orders and destination countries.

### Delivery

Delivery dates indicated in the contract documents are approximate and based on prompt receipt of all necessary information regarding the product covered by the contract. SiliCycle will use reasonable efforts to meet the indicated delivery dates, but cannot be held responsible for its failure to do so.

In the event of any delivery delay caused by the Buyer, SiliCycle will store and handle all items ordered at Buyer's risk and will invoice Buyer for the unpaid portion of the contract price, plus storage, insurance, and handling charges on or after the date on which the product is ready for delivery. The invoice will be payable in full within 30 days from the invoice date, unless otherwise expressly agreed to in writing by SiliCycle.

SiliCycle will not hold orders unless specifically approved. SiliCycle has the right to make partial shipments and bill for those shipments; the buyer will make payment in accordance with the terms mentioned in this policy.

### Shipping and Handling Charges

Shipping charges plus the applicable company handling charges will be prepaid and billed as a separate item on the product invoice. Title to the product and risk of loss shall pass to Buyer upon delivery to a carrier.

### Application

All products are sold for laboratory or manufacturing uses. Only professional laboratory staff should handle the chemicals.



As a recognized industry leader in the development, manufacturing and commercialization of innovative silica gel products, and with multi-ton manufacturing capability, SiliCycle® is your partner of choice for all your **metal removal**, **catalysis**, **synthesis**, and **purification** requirements.

**SiliaMets®**  
Metal Scavengers



- No leaching: no API contamination
- High selectivity: total recovery of the API
- Very good metal affinity: efficient for a wide range of metal catalysts
- Solvent compatibility: can be used in any any solvents (pH 2 to 12)
- Fast kinetic even at room temperature
- Easily scalable
- Thermally and mechanically stable
- Ease of use and flexible formats
- Cost efficient: low cost per gram of metal scavenged
- Available in large quantities (**multi-ton scale**)

**SiliaCat®**  
Heterogeneous Catalysts



- Wide range of organic coupling and hydrogenation reactions (**Suzuki, Sonogashira, Heck, and Stille**)
- SiliaCat silica-supported catalysts for cleaner products and cleaner waste streams
- Ideal for batch or flowthrough applications
- Cost efficient and highly stable
- Reusable and leach proof
- Available in sizes ranging from grams to multi-kilograms quantities

**SiliaBond® C18**  
Chromatographic Phase



- Unmatched quality and performance
- Very highly hydrophobic C18 phase
- A homogeneous functionalized layer
- A unique grafting method ensuring reproducible results
- An unprecedented endcapping efficiency
- Incomparable lot-to-lot reproducibility
- The quality of a monofunctional C18
- Available in large quantities (**multi-ton scale**)

**SiliaBond®**  
Functionalized Silica Gels



- No leaching (chemical stability)
- Selective nucleophile and electrophile scavengers
- High resolution chromatographic phases
- **Supported reagents** for organic synthesis
- Thermally stable and microwave compatible
- Available in large quantities (**multi-ton scale**)

**SiliaChrom®**  
HPLC Columns



- Broad pH range (0,8-12,0)
- High surface coverage
- Wide variety of chemistries available
- Excellent column efficiency
- Long column lifetime
- Low bleed

**SiliaPlate™**  
TLC Plates



- Analytical and preparative TLC plates
- Different sizes and choice of backings
- Normal, reversed and specialty phases

**SiliaFlash®**  
Irregular Silica Gels



- High purity irregular Gel
- Tight particle size distribution
- Very low level of fines
- Neutral pH, low metal content, and controlled water level content
- Lot-to-lot reproducibility

**SiliaSep™**  
Flash Cartridges



- High resolution & reproducibility
- Ultra high performance cartridges available (**SiliaSep HP**)
- Compatible with all commercial systems
- Reversed and specialty phases available

**SiliaSphere™**  
Spherical Silica Gels



- Very high purity & tight particle size distribution
- Low metal content
- High mechanical stability
- Wide choice of phases available (normal, reversed & specialty)

**SiliaPrep™**  
Solid Phase Extraction



- Wide choice of SPE cartridge formats, 96-well plates
- Normal, reversed, fluorinated, ion exchange , and mixed-mode phases
- Certified & Specialty phases (scavengers, reagents, etc.)

